

An Analytical Approach to Understanding Student Debtload Response

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This study examined the influence of student debtload on college persistence using the National Postsecondary Aid Survey of 1992-93. The authors developed and tested a model of student persistence that included total accumulated debt and threshold of accumulated debt, and found the latter a more effective method of examining student debt response. The authors found small negative coefficients for debt and advance possible explanations for the results.

Almost from the inception of the student loan program in the 1960s, there has been speculation about the impact of debtload on student decisions (Harney, 1966; Horch, 1978). This concern intensified in the mid-1980s, and focused on the debtload of law and medical students (Brotherton, 1995; Chambers, 1992; Dial, 1987; Petersdorf, 1991). The literature of the 1990s has focused on default (Greene, 1989; Volkwein, 1995; Volkwein & Szelest, 1994) and debtload (Baum & Saunders, 1998; Choy, 1998; Keynes, 1995; King, 1998; Scherschel & Behymer, 1997; Somers & Bateman, 1997). While much of the literature has been descriptive, little has examined the impact of debtload on student persistence. This study used the National Postsecondary Student Aid Study of 1993 (NPSAS:93) to explore whether debtload influenced persistence. We tested two approaches for examining the influence of debt: Threshold of Debt and Total Debtload, and found the former method superior. We advance several explanations for the small negative effect of debt on persistence and discuss how federal financial aid policy has driven changes in student price response.

Growing Interest in the Impact of Debtload

The scholarly literature on debtload began to appear in the mid-1980s. Several articles were written on the debtload of law, dental, and medical students (Brotherton, 1995; Chambers, 1992; Dial, 1987; Kassebaum, 1996; Petersdorf, 1991; Zarkowski, 1995). This interest was prompted by three main concerns: the number of law and medical graduates who elected to file for bankruptcy shortly after graduation to escape a heavy education debtload; the popular belief that these graduates shunned lower-paying jobs, often in public service, in favor of positions in higher paying specialties; and the growing level of debtload for students in professional school.

"Qualitative studies revealed that debtload and the fear of taking on debt influenced a myriad of student decisions from institutional choice, to major, to personal decisions."

A large group of studies examined debtload more generally, however most did not explore the impact of debt on persistence. These works can be divided into two groups: articles expressing concern over debtload (Atwell, 1987; Fisher, 1987; Henderson, 1987) and studies of the impact of debt on graduates of different types of institutions (Bodfish & Cheyfitz, 1989; Hira, 1992; Holland & Healy, 1989; Pedalino, Chopick, Saunders, & McHugh, 1992; Schapiro, 1991). Most of these researchers focused on recent graduates and concluded that debtload was not a significant problem.

Only one study from this era examined the influence of debtload on undergraduate decisions. St. John (1994a) examined the influence of debt on choice of major using the High School and Beyond 1980 cohort. The study found that choice of major was influenced by social background, high school achievement, high school major choice, and college experience, and that debt burden was not significantly associated with choice of major.

In 1996, there was a surge of publications on student debtload, triggered in part by concern over the higher debt limits contained in the 1992 Reauthorization of the Higher Education Act. One study (Greiner, 1996) had an alarming finding: 26% of the students surveyed (Iowa student loan recipients) had unmanageable debt. This compared to 6.5% in 1986 (Decision Resources Corporation & Westat, 1992) and 8.3% in 1990 (Westat, 1993). Both of these studies used national samples.

In the late 1990s, several more articles on student debtload appeared. The descriptive studies (Baum & Saunders, 1998; Choy, 1998; King, 1998; Scherschel & Behymer, 1997) presented statistical evidence of increasing debtload on college students, their spouses, children, and families. For the most part, they concluded that debt is not excessive, and that graduates can repay these loans. These same studies generally concluded that students can handle even more debt.

Five studies examined how debt influenced the academic decisions of graduate students (DeAngelis, 1997; Somers, Cofer, DeAngelis, & Cook, 1997), undergraduate students (Cofer, 1998; Somers & Bateman, 1997), and community college students (Somers, Austin, Birkner, Flowers, Inman, Martin, & Sullivan, 1998). In the two quantitative studies (Cofer, 1998; DeAngelis, 1997), debt had a small negative effect on persistence. The qualitative studies (Somers et al., 1998; Somers & Bateman, 1997; Somers et al., 1997), however, revealed that debtload and the fear of taking on debt influenced a myriad of student decisions from institutional choice, to major, to personal decisions. Further, students were angry at having to assume more debt than the students of a generation ago.

While the publications on debt have been extensive, there is little quantitative research on how debtload influences student persistence decisions. This study addresses the need for more quantitative studies of student debtload.

Research Questions

Three questions were used as a framework for this study:

- 1) Does debtload affect college student persistence?
- 2) Does the influence of debtload on persistence vary by student background variables?
- 3) In analyzing debtload, does the Total Debtload model yield different results than the Threshold of Debt model?

Method

This study used the restricted version of the National Postsecondary Student Aid Survey of 1992-93 (NPSAS:93) to compare different approaches to assessing the effect of debt on persistence. The NPSAS:93 database was adjusted in three phases to arrive at the study sample. The first phase consisted of eliminating all two-year college students, and the second phase eliminated all records that indicated a "missing value" for the total amount borrowed variable. Finally, to adjust for the over-sampling of seniors, a random sample of approximately 50% of the seniors left after the first two phases was taken to arrive at a more uniform distribution by class level.

Definition of Terms

Several terms used in this paper need defining. The student loan variable, Loans (\$), is taken from the NPSAS variable, TOTLOAN2, and includes current year federal (including PLUS), state, institutional, and private sector loans. Our variables, "Total Debtload" and "Threshold of Debt," are taken from the NPSAS variable BORAMT1, which is the cumulative amount borrowed for all undergraduate education prior to the current academic year, and includes federal (including PLUS), state, institutional, and private sector loans. Total Debtload is a continuous variable that has a large range and a value for every individual record. The Threshold of Debt variables are interval scaled variables derived by a method developed by Somers (1992), using a series of dummy variables. Three variables (low debt, medium debt, and high debt) were developed to represent increasing levels of debt. The method used to derive these variables is explained in the succeeding section. Finally, our term "subsidy" is used in the classical economic sense of monies used to reduce the price of a product or service, and thus applies collectively to all grants, loans, scholarships, and work study awards. The term does not refer to the subsidy paid on a subsidized federal loan.

Model Specifications

Our model (Table 1) drew on the previous NPSAS research (Andrieu, 1990, 1991; Andrieu & St. John, 1993; Cofer, 1998; DeAngelis, 1997; St. John, 1992, 1993, 1994b; St. John & Andrieu, 1995; St. John et al., 1992; St. John & Starkey, 1995a, 1995b; Starkey, 1993; Trammell, 1994). We focused exclusively on within-year progression of students from the fall to the spring semester. The research on persistence suggests that the ideal model to predict persistence would include full background,

TABLE 1
Variable List

Variable	Variable name	Coding
Background		
Ethnicity	African-American	0=no; 1=yes
Ethnicity	Hispanic	0=no; 1=yes
Gender	Gender	1=Male; 0=Female
Age	Under 22	0=no; 1=yes
Age	Over 30	0=no; 1=yes
Income	Low income - less than \$11,000	0=no; 1=yes
Income	High income - greater than \$60,000	0=no; 1=yes
Marital status	Married	0=no; 1=yes
Mother's educational achievement	College degree	0=no; 1=yes
Father's educational achievement	College degree	0=no; 1=yes
Employment	Working full-time	0=no; 1=yes
Financially independent	Independent for financial aid purposes	0=no; 1=yes
College Experience		
Institutional characteristic 1	Doctoral	0=no; 1=yes
Institutional characteristic 2	Private	0=no; 1=yes
GPA	High GPA - more than 3.50 GPA	0=no; 1=yes
GPA	Low GPA - less than 2.00 GPA	0=no; 1=yes
Class - 1	Sophomore	0=no; 1=yes
Class - 2	Junior	0=no; 1=yes
Class - 3	Senior	0=no; 1=yes
Reside on campus	Live on campus	0=no; 1=yes
Work	Work full-time - more than 35 hours per week	0=no; 1=yes
Attendance pattern	Full-time fall semester	0=no; 1=yes
Aspirations		
Test score - low	Low achievement scores - ACT less than 18 or SAT less than 900	0=no; 1=yes 0=no; 1=yes
Test score - high	High achievement scores - ACT greater than 22 or SAT greater than 1070	0=no; 1=yes
Aspirations - 1	College degree expected	0=no; 1=yes
Aspirations - 2	Advanced degree expected	0=no; 1=yes
Price		
Tuition and fees	Tuition and fees normally charged for full-time full year	Actual amount divided by 1,000
Room and board	Room and board normally charged for full-time full year	Actual amount divided by 1,000
Grants (\$)	Total grants - current year	Actual amount divided by 1,000
Loans (\$)	Total loans including PLUS loans - current year	Actual amount divided by 1,000

(Continued on following page.)

TABLE 1
Variable List (cont'd)

Variable	Variable name	Coding
Debt*		
Debtload	Total amount borrowed for education	Actual amount divided by 1,000
Debt threshold - low	Low debt - amount borrowed \$1-3,000	0=no; 1=yes
Debt threshold - medium	Medium debt - amount borrowed from \$3,001 to \$7,000	0=no; 1=yes
Debt threshold - high	High debt - amount borrowed more than \$7,000	0=no; 1=yes

* In both the Total Debtload and Threshold of Debt Models, students with accumulated debt are compared to students with no accumulated debt.

campus experience, college characteristics, aspirations, prices, and financial aid variables. In addition to including the variables consistent with prior studies, the amount of accumulated debt was added to the model in two different forms, Total Debtload and Debt Threshold.

Two alternative approaches of studying accumulated (as compared to current year) debt were used, Total Debt and Threshold of Debt. For the Total Debt method, the total amount borrowed for education was divided by 1,000. For the Threshold of Debt model, the variable was split into high debt, medium debt, and low debt. As with other categorical variables in the analysis, a frequency distribution of the variable was examined, and divided into thirds. "High debt" refers to a total amount borrowed for education of over \$7,000; "low debt" refers to a total amount borrowed of \$3,000 or less; and "medium debt" refers to a total amount borrowed of \$3,001 to \$7,000. Students with these threshold amounts were compared to students with no debt.

Statistical Method

Because the persistence decision is dichotomous, logistic regression is used in this study. Logistic regression is the recommended method (Cabrera, 1994) in such situations. Each beta coefficient is converted to a Delta-P using a method recommended by Peterson (1984). The Delta-P measures change in the dependent variable, and is particularly useful in policy analysis. For dichotomous variables, the Delta-P provides a measure of the extent to which the outcome was likely to change if a student had the specified characteristic. For example, a Delta-P of 0.050 for females is interpreted as increasing the probability of enrollment by 5.0 percentage points for this group.

Results

The analysis is presented in two parts. A description of the sample is followed by two logistic models comparing four-year college within-year persistence based on Total Debtload and Threshold of Debt.

Descriptive Statistics

Descriptive statistics for the sample and the two subgroups are shown in Table 2. Of the 16,952 students included in the sample, 2,064 (12.2%) did not persist from the fall semester to the spring semester. There were noticeable differences in characteristics between students who persist and students who do not persist. For instance, 18.2% of the married students did not persist, nor did 15.7% of the African-American students. Dropout levels were higher for first-year students (17.3%) and decreased for each succeeding level, with seniors having the lowest rates (5.6%). This variation by level is normal, and important to the analysis. Students with high aspirations and achievement scores persisted at a higher rate than students with low aspirations and low achievement scores.

It is interesting to note that persisting students had higher levels of subsidies and debt than non-persisters. Those students who received grants and those who received loans persisted at a higher rate than those who did not. The statistics in Table 2 include the mean and standard deviation of price variables for all students, including those with no grants or loans, and carrying no debt.

Table 3 compares the total sample with those students who received current subsidies (i.e., grants and loans) and had any accumulated debt. In this sample, 44.6% of all students received current year loans; however, the mean current year loan amount for those who received a subsidy and/or had accumulated debt was more than twice that of the all students. In addition, the mean amount of accumulated debt for students who received a subsidy or had accumulated debt was 77% higher than the mean for all students.

Table 4 further examines debt in persisting and non-persisting students. At the lower levels of accumulated debt (no debt and debt of \$3,000 or less), a greater percentage of non-persisters than persisters carried no or low debt. The difference between persisters and non-persisters increased from middle to high debt, and at that point a substantially larger percentage of persisters had larger amounts of debt. Table 5 displays similar information for grants and loans. It is notable that a larger percentage of non-persisters fell within the categories "no grants," and "no loans."

TABLE 2
Descriptive Statistics for Persisters and Non-Persisters*

Variables	Percent of Total	Percent of Persisters	Percent of Non-Persisters
Background			
Gender: Male	45.2	88.1	11.9
Gender: Female	54.8	87.6	12.4
African-American	9.6	84.3	15.7
Hispanic	7.0	86.3	13.6
Other race/ethnicity	6.5	90.0	10.0
Caucasian	77.0	88.3	11.7
Age under 22	57.7	90.2	9.8
Age over 30	13.8	80.2	19.8
High income (> \$60,000)	21.2	91.3	8.7
Middle income (\geq \$11,000 \leq \$60,000)	60.6	87.3	13.3
Low income (< \$11,000)	18.1	87.5	12.5
Dependent	65.2	90.1	9.9
Married	15.7	81.8	18.2
Mother has college degree	22.3	90.8	9.2
Father has college degree	34.4	90.4	9.6
Aspirations and Achievement			
Some college	1.0	60.6	39.4
College degree	17.7	82.8	17.2
Advanced degree	69.0	90.6	8.4
High achievement scores	27.2	93.7	6.3
Low achievement scores	16.7	87.7	12.3
College Experience			
Freshman	28.9	82.7	17.3
Sophomore	21.3	85.7	14.3
Junior	24.6	88.9	10.1
Senior	25.2	94.6	5.6
Live on campus	31.0	91.5	8.5
Private institution	33.9	86.9	13.1
Full-time	78.5	91.1	8.9
High GPA	15.2	90.3	9.7
Low GPA	21.4	76.7	23.3
Doctoral institution	36.7	90.4	9.6
Work full-time	27.9	83.3	16.7
Prices and Subsidies (mean, standard deviation in thousands)			
Tuition	$M=5.20, SD=4.73$	$M=5.18, SD=4.78$	$M=5.29, SD=4.38$
Room & board	$M=2.84, SD=3.33$	$M=2.88, SD=3.44$	$M=1.74, SD=2.16$
Grant amount	$M=1.88, SD=2.98$	$M=1.99, SD=3.06$	$M=1.09, SD=2.13$
Loan amount	$M=1.54, SD=2.33$	$M=1.61, SD=2.37$	$M=1.01, SD=1.95$
Work-study amount	$M=.171, SD=.544$	$M=.184, SD=.564$	$M=.079, SD=.353$
Debt			
High debt	20.7	92.1	7.9
Medium debt	21.4	88.6	11.4
Low debt	16.5	84.6	15.4
No debt	41.4	87.3	12.7
Have loans	44.3	91.0	9.0
Have grants	52.9	90.3	9.7
Total accumulated debt (mean, standard deviation in thousands)	$M=3.70, SD=5.45$	$M=3.85, SD=5.56$	$M=2.61, SD=4.36$

* Figures may not add up to 100% due to rounding.

TABLE 3
Comparison of Mean Amount of Accumulated Debt, Current Year Loans,
and Current Year Grants for Students Receiving a Subsidy
Compared With All Students in the Sample

		All Students in Sample	Students Receiving Current Subsidy and/or Who Have Accumulated Debt
Amount of Accumulated Debt	Mean	\$3,700	\$6,552
	Standard deviation	\$5,450	\$5,824
Current Year Loan Amount	Mean	\$1,537	\$3,707
	Standard deviation	\$2,239	\$2,243
Current Year Grant Amount	Mean	\$1,878	\$3,551
	Standard deviation	\$2,293	\$3,300

TABLE 4
Pattern of Debt Threshold for Persisters and Non-Persisters

	Percent of Total	Percent of Persisters	Percent of Non-Persisters
No debt	41.4	40.8	45.7
Low debt	16.5	15.9	20.7
Middle debt	21.4	21.6	20.1
High debt	20.7	21.7	13.5

TABLE 5
Current Year Loans and Grants for Persisters and Non-Persisters

	Percent of Total	Percent of Persisters	Percent of Non-Persisters
Have loans	44.6	45.8	32.9
No loans	55.4	54.2	67.1
Received grants	52.9	54.4	42.3
No grants	47.1	45.6	57.7

Logistic Models

As shown in Table 6, except for the debt variables, the same sixteen variables were significant in both the Total Debtload and Threshold of Debt models. These included three background, three aspiration, six college experience, and four price and subsidy variables. In addition, all three of the Threshold variables were significant and negatively associated with persistence. Total Debtload was not significantly associated with persistence.

Of the three background variables, age (those less than age 22), and high income (more than \$60,000) were significant and positively associated with persistence. Students with low income (less than \$11,000) were significant and negatively associated with persistence. Aspirations for a college or advanced degree and high test scores were significantly and positively related to persistence.

Being an upper division student (junior or senior), campus resident, or full-time student was significant and positively related to persistence. Low GPA and working full-time had a negative and significant effect on persistence. All of the price and subsidy variables were significantly related to persistence. Tuition, however, had a negative effect.

The difference in the two models was evident when examining the debt variables. Accumulated debt in the Total Debtload model was not significantly related to persistence. All of the debt thresholds in the Threshold of Debt model were significant and negatively related to persistence.

The pseudo r^2 for the Threshold model was .0957. It correctly predicted 99.21% of the persisters and 6.59% of the non-persisters, for an overall prediction rate of 87.93%. The pseudo r^2 for the debtload model was .0949. The model correctly predicted 99.19% of the persisters, 6.4% of the non-persisters, and 87.89% of the overall persistence decisions.

Discussion

In this section, we discuss the two approaches to assessing the impact of debt on student within-year persistence. Alternative theories are developed to interpret the findings in relation to previous research and the current environment.

Threshold versus Debtload Approach

The two approaches to assessing the impact of debt on student persistence have striking similarities and differences. The demographic, aspiration, college experience, price, and subsidy variables all exhibit similarities. The effect shown for tuition is consistent with, although substantially smaller than, the effect of tuition in prior studies (Somers & St. John, 1997; St. John et al., 1996; St. John & Starkey, 1995b). All of these studies, however, found a small negative effect for loans on within-year persistence.

The debt variables are interestingly different. The Total Debtload effect, although negatively associated with persistence,

TABLE 6
Comparison of Alternative Models
Peterson's Delta P - Percentage Point Change

	NPSAS:93 Debtload Model	NPSAS:93 Threshold of Debt Model
Background		
Gender-Male	0.0026	0.0028
African-American	-0.0192	-0.0180
Hispanic	-0.0119	-0.0120
Other race/ethnicity	0.0099	0.0079
Age under 22	0.0365	0.0359
Age over 30	0.0031	-0.0002
High income (>\$60,000)	0.0373	0.0352
Low income (<\$11,000)	-0.0283	-0.0271
Dependent	-0.0174	-0.0179
Married	-0.0162	-0.0173
Mother has college degree	0.0080	0.0070
Father has college degree	0.0058	0.0051
Aspirations & Achievement		
College degree	0.0465	0.0455
Advanced degree	0.0665	0.0661
High achievement scores	0.0328	0.0329
Low achievement scores	0.0081	0.0082
College Experience		
Sophomore	0.0108	0.0114
Junior	0.0372	0.0375
Senior	0.0833	0.0837
Live on campus	0.0210	0.0214
Private institution	0.0039	0.0036
Full-time student	0.0526	0.0528
High GPA	-0.0011	-0.0011
Low GPA	-0.1248	-0.1244
Doctoral institution	0.0118	0.0111
Work full-time	-0.0240	-0.0250
Prices and Subsidies		
Tuition	-0.0071	-0.0072
Grant amount	0.0115	0.0118
Loan amount	0.0108	0.0128
Work-study amount	0.0214	0.0224
Debt		
Debtload	-0.0009	
High debt		-0.0314
Medium debt		-0.0332
Low debt		-0.0250

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TABLE 6
Comparison of Alternative Models
Peterson's Delta P - Percentage Point Change (cont.)

	NPSAS:93 Debtload Model	NPSAS:93 Threshold of Debt Model
Model Statistics		
Sample size	16952	16952
Pseudo R ²	9.49	9.57
Chi-square	1778	1793
Persisters projected	99.19	99.21
Non-persisters projected	6.4	6.59
Overall predicted	87.89	87.93

Significant at $p < .001$

Significant at $p < .01$

is not significant ($p=.2323$). The Threshold of Debt variables are all significant and negatively related to persistence. In general, as the debt threshold level increases, so too does student drop-out. Following a corollary of the emergent theory as expressed in prior studies (St. John & Starkey, 1995a), the increasing negative effect as debt rises could be the result of borrowing more to meet rising costs.

The literature is noticeably silent on the treatment of debt in persistence research. Our findings indicate that the Threshold of Debt method is superior to that of the Total Debtload method. The Total Debtload method understates the importance of total amount of debt on persistence decisions. We believe that coupling the Total Debtload method of estimating the effect of accumulated debt on persistence with the finding of a positive coefficient for current year loans could lead to erroneous assumptions for financial aid and tuition policies.

The Threshold of Debt method clearly illustrates the effect of accumulated debt on within-year persistence. We believe that, rather than being incremental, the effect of debt is felt in lump sums. That is, a student borrows in a lump sum (which varies depending on need and other factors) at the beginning of the semester. When the next semester begins, the student has to again make a decision to persist based, in part, on this new, higher level of debt. Students view threshold levels as intimidating, especially when they move from one perceived level to another.

Analysis

The results of this study differ substantially from studies on within-year persistence using previous versions of the National Postsecondary Student Aid Study (NPSAS). Most interesting is our finding of a positive coefficient for current year loans, and only a small negative effect for tuition. Earlier studies by St. John and associates (St. John, 1994b, 1996; St. John et al.,

1992) provide empirical support for negative coefficients for aid and price variables, and conclude that negative coefficients for financial aid, in some instances, are attributable to the inadequacy of aid. Unlike the current study, which uses NPSAS:93, these prior studies used NPSAS:86 to assess the effects of financial aid and subsidies on persistence.

Tables 7 and 8 compare the subsidy amounts from the current study and two prior studies, NPSAS:86 and NPSAS:93. These data indicate an increase in the amount of financial aid available to college students between NPSAS:86 and NPSAS:93, with a concomitant increase in tuition.

TABLE 7
Analysis of Price and Subsidy Variables

	Average Grant Amount	Average Loan Amount	Average Tuition
St. John & Starkey (1995) NPSAS:86	\$1,622	\$962	\$3,916
St. John, Oescher, & Andrieu (1995) NPSAS:86	\$1,622	\$962	\$3,916
Cofer & Somers (1997) NPSAS:93	\$1,880	\$1,574	\$4,540
Cofer & Somers (1997) NPSAS:93 Students Receiving Subsidy	\$3,551	\$3,707	\$5,198
NPSAS:86 - Public institutions	\$1,656	\$2,022	\$1,213
NPSAS:86 - Private institutions	\$3,507	\$2,568	\$4,893
NPSAS:93 - Public institutions	\$2,288	\$3,076	\$3,044
NPSAS:93 - Private institutions	\$4,832	\$3,798	\$11,339

The results of this study contradict prior studies. But why the change? It would appear that the students in our study are different demographically, psychologically, and sociologically from those students in NPSAS:86. A prior longitudinal study (Cofer & Somers, 1997) examined the non-financial aspects of first- to second-year persistence for three institutions for four consecutive years (1992, 1993, 1994, 1995). The coefficients of several background variables (gender, ethnicity, and age) and several college experience variables (ACT scores, remediation, and course load) varied from having a negative association with persistence to having a positive association in different years. The conclusion was that outcome measures are determined, in large part, by the input, and that the input, (i.e., the students) changes from year to year.

Table 8, shows that in the later survey, students are borrowing more. From a purely demographic standpoint, as

TABLE 8
Average Amount of Aid Received
by Aided Undergraduate Students
by Type and Source - NPSAS:86 v. NPSAS:93

	NPSAS:86	NPSAS:93
Type of Aid		
Grant	\$2,220	\$2,288
Loans	\$2,279	\$3,076
Total	\$3,132	\$4,043
Source of Aid		
Federal	\$2,263	\$3,789
State	\$1,168	\$1,385
Institution	\$1,853	\$1,755

shown in Table 9, a greater percentage of students in the NPSAS:93 database are part-time, independent, older, have a lower GPA, and attend public institutions. There are more African-American and Hispanic students, and all students aspire to a higher level of education. Due to a definition change in 1989, NPSAS:93 specified that students 24 years or older were financially independent, regardless of their actual family financial circumstances. This distinction is important from a financial aid standpoint, because dependent students must use their parents' as well as their own income and assets when calculating financial need. Independent students are required to use only their own income and assets.

A second plausible explanation of the effects of price, subsidy, and some demographic variables on persistence is based on studies somewhat outside the mainstream of current persistence research (Cabrera, Castaneda, Nora, & Hengstler, 1992; Cini & Harden Fritz, 1996; Okun, Ruehlman, & Karoly, 1991; Rusbult, 1980). Rusbult (1980) proposed a theoretical model of investment to explore continuation of close relationships. This investment theory suggested that the departure from or persistence in an organization was influenced by commitment, investment, satisfaction, and alternative value. Accordingly, students' persistence at a particular institution should increase if they experience more rewards than costs, have few or no good alternatives, and have invested substantial resources, time, and money. Cabrera et al. (1992) concluded that receipt of financial aid in the form of scholarships or grants may have been viewed as a form of recognition by recipients, thereby increasing their satisfaction with their current institution. In addition, the Cabrera et al. study suggested that financial aid decreased the burden of meeting costs, thereby decreasing the attractiveness of alternatives, such as transferring or quitting school. Cabrera

TABLE 9
Comparison of Demographic Variables*
NPSAS:86 v. NPSAS:93

Variable	Percent in NPSAS:86	Percent in NPSAS:93
African-American	9.4	10.3
Hispanic	6.8	8.0
Asian	5.1	4.0
American Indian	1.0	0.9
Caucasian	77.8	76.8
Male	44.8	44.5
Female	55.2	55.5
Dependent	62.8	47.9
Married	23.8	n/a
Full-time student	62.2	46.2
Live on campus	19.8	12.8
Work full-time	42.8	n/a
Four-year institution	38.0	46.4
Public institution	48.7	76.4
Income of Dependent Students		
High income (> \$60,000)	16.1	27.0
Middle income (\geq \$10,000 \leq \$60,000)	73.6	66.8
Low income (< \$10,000)	10.3	6.2
Income of Independent Students		
High income (> \$60,000)	7.6	11.1
Middle income (\geq \$10,000 \leq \$60,000)	55.0	64.3
Low income (< \$10,000)	24.6	24.6
Age of Students		
23 or younger	60.4	57.7
24-29	16.8	13.8
30 or older	22.8	28.5

* May not add up to 100% due to rounding.

et al. also concluded that receipt of financial aid eliminated the need to secure employment, and if students had employment, receipt of financial aid allowed them to spend less time at that job. This allowed more time for social integration. When combined, these factors reinforced the students' commitment to a particular institution, in that the current institution was viewed as instrumental in securing future aid. These factors all tended to increase motivation to perform at a high level. According to Rusbult's Investment Theory, the larger the commitment and

"The amount of accumulated debt carried by students and their families has a significant and negative impact on within-year persistence."

satisfaction, and the less attractive the alternatives, the more one is willing to invest in maintaining the relationship.

Rusbult's Investment Theory is directly applicable to the present study. Based on the current findings, students who intend to complete their degrees at both the bachelor's and graduate level are more likely to persist. Also, as a student's classification changes from sophomore to senior, the likelihood of persistence increases. This commitment to persist is coupled with the assumption that, as the grant amount increases, the satisfaction level increases. Based on the conclusions of Cabrera et al., we can further assume that the increase in social integration, which influences satisfaction and commitment, is enhanced not only by continued progression through the class levels, but also by the finding that on-campus residence increases the likelihood of persistence. On the other hand, working full-time, which decreases social integration, and therefore satisfaction, has a negative influence, and accordingly students are more likely to leave the relationship.

Using the Rusbult theory, several scenarios—both positive and negative—are suggested. Non-persistence would require repayment of accumulated debt in the face of a tough job market and the loss of expected grants (i.e., income). Persistence would enable the student to capture those future grants and continue to postpone repayment of accumulated debt.

Intent to persist, satisfaction with and commitment to the institution, and lack of viable alternatives, according to the Rusbult Theory, would encourage students to increase their investment, via increased loans, tuition, and living expenses, to maintain their relationship with the institution. The negative coefficient on debt thresholds, however, indicates that there is a limit to those investments.

The historical setting of this study may well reflect the shifting philosophy of federal financial aid policy from grants to loans. In 1992, when the data for our study were collected, loans had long replaced grants as the "subsidy of choice" in federal financial aid policy. During the 1970s, 76% of federal student financial aid was in the form of grants and 20% in loans. By the mid-1980s, that ratio had almost reversed, with loans accounting for 67% and grants 29% of federal financial aid (Hannah, 1996). By the time NPSAS:93 data were collected, the acceptance of debt as a method of financing a college education was firmly entrenched, out of necessity rather than choice.

Finally, the amount of accumulated debt carried by students and their families has a significant and negative impact on within-year persistence. This result should not be obscured in this discussion, particularly in light of the findings for current year loans. In the short term, students are becoming more willing to borrow to attend college, and at an increasing rate. This borrowing to finance tuition appears to have decreased the influence of rising tuition, room and board costs on persistence

decisions. However, the long-term effect of student loan borrowing decreases the likelihood of continued enrollment.

Conclusion

This study provides additional understanding of price and subsidy response theory over time. Assuming that the NPSAS:93 data are accurate, then the assertion of Dresch (1975) that price response coefficients change over time are confirmed by this study. The question is, why do they change?

The student body in 1992-93 was substantially different from that of 1986, and federal financial aid policy has shifted toward benefitting middle-income students through the more extensive use of loans rather than grants. The reaction of students as manifest in NPSAS:86 appears to be different from this study, based on NPSAS:93. The acceptance of the policy shift from grants to loans appears to have been gradual, along with the acceptance of debt by college students and their families.

Second, there does not appear to be a single model that can be applied equally to all students. A preliminary analysis of various student groups (traditional-age students, public college students, and private college students) by the authors, which is not reported here, shows similar, but not identical, results. College students today are a non-homogenous entity when compared to their predecessors, and they do not all react in the same manner. Public and private school students, non-traditional students, African-American and Hispanic students, and working students all have different motivations for attending college. They also have different funding sources than previous students: more loans, company benefits, and pay-as-you-work plans. The traditional full-time, full paying, eighteen- to twenty-three-year-old student is clearly the new minority. The success of our model to project accurately which students will persist, and the corresponding lack of success in the projection of which students will not persist, lead us to conclude that additional variables, exogenous to the model, and perhaps absent from NPSAS, affect non-persistence.

The economic value of a college education is firmly established in the literature (Astin, Green, Korn, & Schalit, 1985; Leslie & Brinkman, 1988; Leslie, Johnson, & Carlson, 1977; Mattila, 1982). We conclude that students and their families are willing to invest time and money, and assume debt, when the students are rewarded by grants and good grades and feel socially integrated into the campus environment. Therefore, the economic payoff of a college education is preconditioned by satisfaction with, and commitment to, the institution. When all of these factors are present, students will invest more in terms of tuition and living costs, and will assume more debt.

Clearly college students and their families are willing to assume greater amounts of debt, but there is a limit. Who breaches that limit first, the federal government or the student, will direct federal financial aid policy in the future. The full

impact of the changes to the student loan program contained in the 1992 and 1998 amendments to the Higher Education Act of 1965 has not yet been felt. Our study, using NPSAS:93, has just begun to examine the influence of increased debt amounts on students and their families. However, the cumulative impact of debt may not be clear until comparative studies using NPSAS:96 and NPSAS:99 have been completed. Only with this long-term, comparative data will the patterns and relationships between debt and persistence be explained.

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